BOTANICAL NOTES.—In the prospectus of the *Botanical Gazette* for 1881, the editor takes strong ground in favor of more physiological work, and "would gladly devote half of its space" to papers and notes in this department of Botany. It is to be hoped that the editor may succeed in his laudable undertaking. It certainly is high time that we have a botanical journal in this country devoted entirely to such work.——A very useful "Synoptical Table for the Determination of Fibers of Vegetable Origin" is published in the August-September number of the *Botanical Gazette.* It is from Vetellart's work, "Sur les fibres employes dans l'industrie."——In the September "Torrey Botanical Bulletin," John Williamson contributes a readable account of the "Ferns on the Cumberland." The discovery of *Adiantum capillus-veneris* in Southern Kentucky was confirmed.——A new and enlarged edition of Rattan's "Popular California Flora" has just appeared, from the house of Bancroft & Co., of San Francisco. It will prove quite valuable to the beginners in botany in central California. Many of the more difficult orders, as for example, the Coniferæ, Gramineæ, Cyperaceæ, Salicaceæ, Compositæ, etc. are entirely omitted as too hard for the beginner.——The second volume of the "Botany of California," by Sereno Watson, has just appeared. It will be noticed more fully hereafter.——In the *American Journal of Science and Arts* for October, Dr. Gray briefly notices two recent Swedish contributions to Pomology. One of these records the results of trials made of varieties of apples and other fruits, with a view to determining the northern limit of their hardiness. More than eight hundred varieties were tried, the investigation extending over a period of twelve years. Our American fruit growers would doubtless do well to acquaint themselves with these works.——The more important articles in Caruel's *Nuovo Giornale Botanico Italiano* for July, are by Jatta on the lichens of Central Italy; Macchiati, on the periodical spontaneous movements of the stamens of *Ruta bracteosa* and *Smyrnium rotundifolium* and Cugni on the germination of oily seeds. ——The "Catalogue of Pacific Coast Fungi," by Dr. Harkness and J. P. Moore, published under the direction of the California Academy of Sciences, is a most creditable one. The only other State in the country (for this catalogue is practically confined to California), whose fungi have been as fully catalogued is North Carolina, Dr. Curtis having done for his State in 1867, what the authors of the present catalogue have in 1880 done for theirs.

## ZOOLOGY.[1]

THE METAMORPHOSIS OF ACTINOTROCHA.[2]—Schneider first showed that the larva (Actinotrocha) of the Gephyrean, Phoronis,

[1] The departments of Ornithology and Mammalogy are conducted by Dr. ELLIOTT COUES, U. S. A., Washington, D. C.

[2] Abstract of a paper read before the American Association for the Advancement of Science, in Boston, August, 1880.

passes into the adult condition through the development of a deep pouch-like invagination of the ventral body-wall which becomes attached to the stomach, and is at length suddenly evaginated, dragging out into its cavity a long U-shaped loop of the intestinal canal, and thus producing the remarkable flexure of the latter in the adult. This pouch after its evagination forms the greater part of the body; the opposite or dorsal side of the larva becomes much shortened, and is only represented in the adult by the short interval between the mouth and the anus. A study of two species of Actinotrocha occurring in Chesapeake Bay (to be elsewhere more fully described), suggests the following explanation of the significance and origin of this strange metamorphosis:

Considerations which for want of space cannot be here detailed, leave little doubt that the primitive forms among the Gephyrea are those which, like Thalassema or Bonellia, have the mouth and anus at opposite extremities of the body. Forms like Phoronis or Phascolosoma, in which these two openings are near the same extremity, are evidently derivative; in the case of Phoronis, at least, I assume this structure to have been brought about by the flexure of a primitive form into a U-shape (in order, perhaps, to void excrement through the mouth of the tube inhabited by the worm), and the subsequent obliteration of external evidences of this flexure through coalescence of the two parts of the body thus flexed. Such a habit of flexure may be actually observed among some Polychæta and Holothurians; and in the latter case several stages in the obliteration of flexure by coalescence may be observed. The Polychætous larva, Mitraria, affords a further illustration of this point.

Through whatever process we assume the peculiar flexure of the intestine to have been effected, it is clear that the pouch of Actinotrocha, *both before and after its evagination*, is a development of the *ventral* region of the body. And it follows that in the adult the ventral region is greatly in excess of the dorsal, while in the larva they are externally nearly equal. The pouch of the larva is evidently a provision to admit of extensive increase in the ventral region as a preparation for the adult structure, without changing the external form of the body, and thus without impairing the adaptation of the larva to its Pelagic life. Thus the creature is enabled to pass at once, by a single leap, as it were, from one set of conditions to an entirely different set, without having to pass through intermediate stages. Evidently a great saving of time and energy is thus effected.

The pouch is probably to be regarded as a specialization of a primitive simple infolding of the ventral body-wall. The metamorphosis is in reality a sudden and extreme flexure of the larval body, and may be considered as the ontogenetic repetition of a habit of adult ancestral forms.—*Edmund B. Wilson.*

OCCURRENCE OF THE WEB-FINGERED SEA-ROBIN ON THE COAST OF MAINE.—I wish to place on record the occurrence on the coast of Maine of *Prionotus carolinus* (Linn.) Cuv. and Val., the web-fingered sea-robin. I have a specimen which I obtained from a fisherman who took it in a seine with other fishes off Harpswell in Casco bay, on June 26th of this year. The fisherman informs me that another specimen was obtained at the same time.

This species seems never to have been mentioned as occurring so far north before. Storer in his "History of the Fishes of Massachusetts," 1867 (Mem. Amer. Acad.), states that it occasionally occurs in Massachusetts bay. Goode and Bean in their "Catalogue of the Fishes of Essex County, Mass." (Bulletin of the Essex Institute, Vol. XI), mention specimens taken at Salem.—*L. A. Lee, Brunswick, Maine.*

THE LITTLE STRIPED SKUNK CLIMBING.—It may not be uninteresting to know that one alone of the skunk family, so far as I have observed, possesses the faculty of tree climbing; the *Mephitis putorius.* This is a well established fact, as the numerous specimens captured, with one exception, all have been taken from trees, and as the species is common, only less abundant than the *Mephitis mephitica*, the climbing proclivity is too often put to the test for the animal's good. I am not aware that this habit has ever been mentioned in published works; nor do I think that it is known outside of this State.—*G. W. Marnock, Helotes, Texas.*

VORACIOUSNESS OF CHORDEILES POPETUE BAIRD.—While out gunning a few evenings ago, I shot a specimen of the above species, that was flying very low. Just in the dusk of evening, I was surprised to find the bird so heavy and so large. The next morning when I came to take the skin off, I found the cause of the weight and enlargement was principally due to the food the creature had taken. I took from the food sacks as many insects as I could hold in the hollow of one hand, and counted them. To my astonishment I found over six hundred. There were gnats and flies of several species, ants, small beetles and the legs of grasshoppers. I think these birds ought to be encouraged as insect exterminators.—*F. L. Harvey, Ark. Ind. Univ., Fayetteville, Ark.*

LEECHES ON A TURTLE.—To-day I found a turtle thirteen centimeters long and seven centimeters wide, on which were two hundred and forty-nine leeches. One of these, attached to the left side of the neck, was of adult size. The others averaging about three mm. in length in the contracted state were divided in three groups. The largest situated in the fold above the right hind leg, contained one hundred and forty-three. The next above the left hind leg contained ninety-two. The last above the right fore leg contained thirteen.—*Wm. Herbert Rollins, 12 Beacon street, Boston.*

THE ORGANS OF SMELL IN INSECTS.—A recent number of Siebold and Kölliker's Zeitschrift, contains an article by G. Hauser, on the minute structure of the sense organs in the antennæ of different insects, which throws much new light on the functions of the antennæ of insects. He concludes that the organs of smell consist in insects, *i. e.*, all the Orthoptera, Pseudoneuroptera, Diptera and Hymenoptera, also in a large part of the Lepidoptera, Neuroptera and Coleoptera: 1. Of the antennal nerve; 2. Of a terminal perceptive apparatus, which consists of rod-bearing cells arising from hypodermis-cells, with which a nerve-fiber connects; 3. Of an apparatus consisting of a pit or a cone filled with a serous fluid, which are to be considered as simple infoldings and projections of the epidermis. He then discusses the mode of evolution of these organs, considering the fact that the males of all orders of insects have more developed antennæ than the females, the latter being the more sluggish and living in more retired and concealed places, while the males have more active habits, sharper senses, and are more likely to find the females, and thus ensure the maintenance of the species.

ACTION OF ACIDS AND COLOR LIGHT ON MARINE INVERTEBRATES.—M. Yung has recently investigated the effects of alkaline or acid media on Cephalopoda, and with results pretty similar to those of M. Richet with crayfish. The animals are extremely sensitive to the action of mineral acids; where litmus hardly announces the presence of an acid, a young poulpe will immediately give signs of great pain. But more is required to prove fatal. With one cc. in two litres of water, sulphuric, nitric, or hydrochloric acid proved fatal (in from two to four and a half hours) to *Eledone moschata*; but not to oxalic acid. Sulphuric acid was the least toxical of the mineral acids. Of the much less energetic organic acids, tannic acid acts most rapidly. The alkalies range as follows in (decreasing) order of toxical power:—Ammonia, potash, soda, lime, baryta; the action of ammonia being extremely rapid. M. Yung, has also verified, in the main, for marine animals, the results of his former experiments on fresh-water animals, regarding the influence of colored light on animal development; finding violet and blue light stimulant, while red and green retards the growth; yellow comes nearest to white.—*English Mechanic.*

THE THORAX OF THE BLOW FLY.—An essay on this subject by Arthur Hammond, treats especially of the limits of the several segments of the connate thorax of the Diptera. The author enters fully into the history of the different opinions relative to the morphology of the thorax, and then considers the structure of the thorax in other insects. He calls attention to the fact that in the Lepidoptera and Hymenoptera, the development of the segment is proportioned to that of the wings, and shows that the same rule holds good in the Diptera, the metathorax being as obsolete as the

long appendage it carries. He then examines the evidence derived from a study of the muscular and nervous parts, and from the phenomena of development. The work is thoroughly well done, but of such a nature that it cannot be abstracted. The two plates evince excellent artistic skill.

THE SWIMMING-BLADDER OF FISHES.—In a recent note to the Paris Academy, Prof. Marangoni gives the results he has arrived at in a study of the swimming-bladder. He states, first, that it is the organ which regulates the migration of fishes, those fishes that are without it not migrating from bottoms of little depth, where they find tepid water; while fishes which have a bladder are such as live in deep, cold water, and migrate to deposit their ova in warmer water near the surface. Next, fishes do not rise like the Cartesian diver (in the well known experiment), and they have to counteract the influence of their swimming-bladder with their fins. If some small dead and living fishes be put in a vessel three-quarters full of water and the air be compressed or rarefied, one finds in the former case that the dead fish descend, while the living ones rise, head in advance, to the surface. Rarefying has the opposite effect. Fishes have reason to fear the passive influence due to hydrostatic pressure; when fished from a great depth, their bladder is often found to be ruptured. Thirdly, the swimming-bladder produces in fishes twofold instability, one of level, the other of position. A fish, having once adapted its bladder to live at a certain depth, may, through the slightest variation of pressure, be either forced downwards or upwards, and thus they are in unstable equilibrium as to level. As to position, the bladder being in the ventral region, the center of gravity is above the center of pressure, so that fishes are always threatened with inversion; and, indeed, they take the inverted position when dead or dying. This double instability forces fishes to a continual gymnastic movement, and doubtless helps to render them strong and agile. The most agile of terrestrial animals are also those which have least stability.

ZOOLOGICAL NOTES.—From his study of the mollusks of the Challenger expedition, the Rev. R. B. Watson concludes that there are shallow and deep water species, *i. e.*, that depth of water is an important condition of molluscan life; while temperature is a more important condition than depth, the two combined proving barriers to distribution. It appears that where barriers of depth and temperature do not check distribution, there seems, in ordinary circumstances, no limit to universality of distribution, and there are actually existing species whose distribution is cosmopolitan, no barriers having availed against their passage; and, finally, Mr. Watson finds no trace in such species of essential, lasting and progressive change. These views are not new, but interesting as confirmed by recent investigations over the larger part of the

ocean bottom.——Spallanzani's experiments on the regeneration of the head of gasteropods have been confirmed and extended by Carrière, whose experiments show that the eyes, tentacles and labial processes may be completely regenerated, but not the pharynx or the brain, the destruction or removal of which causes the death of the animal.——Bees, wasps, &c., have been found to possess a spur at the apex of the first pair of tibiæ, whose function it is to clean the tongue and perhaps the antennæ also.——An odoriferous apparatus has been discovered by Von Richenau in *Sphinx ligustris*, consisting of a bunch of colorless hair-like scales lying in a fold on each side of the first abdominal segment. According to a notice in the *Journal* of the Royal Microscopical Society, the organ could be extruded from the fold by pressure. The aperture has the form of a cylindrical tube, and here a strong musky scent was perceptible, which did not occur elsewhere. The scales are visible with the naked eye.——Girard's *La Phylloxera* is a little closely-printed brochure of 120 pages, giving a résumé of all that is known in France concerning this dreadful pest. It is accompanied by a map of France, showing the districts more or less infested.——Some points in the developmental history of the lamprey eel are briefly discussed by Dr. W. B. Scott, in *Zoologischer Anzeiger* (Nos. 63, 64). No. 66 of the same useful periodical contains a notice of a viviparous Chirodota (*C. vivipara* = *C. rotifera*).——In our last number Fabre's discovery of parthenogenesis in a wild bee, Halictus, was noticed; we now have to record the discovery claimed by J. A. Osborne, in *Nature* for Sept. 30, of parthenogenesis in a beetle, *Gastrophysa raphani*. Mr. Osborne possessed a living beetle reared from an unfertilized egg.——The embryology of the gar-pike (Lepidosteus) has recently been studied by Messrs. Balfour and Parker, of England, from eggs supplied by Mr. A. Agassiz. They find that the segmentation of the egg is complete as in the sturgeon, and that the nervous system is formed by a solid thickening of the exoderm, as in the bony fishes, and not by the closure of a groove, as in the sturgeon; while the general relation of the embryo to the yolk, and the general characters of the germinal layers are precisely like those in the bony fishes.

## ANTHROPOLOGY.[1]

New Archæological Enterprises.—In addition to the successful institutions, both national and local, for the exploration of our American antiquities, two new enterprises have been set on foot with every promise of success, the Archæological Institute of America and the Lorillard Mission to the ruined cities of Central America. Of the former we have a full account in the first annual report of the executive committee, 1879–80, with a study of the houses of the American aborigines, by Lewis H. Morgan;

[1]Edited by Prof. Otis T. Mason, Columbian College, Washington, D. C.